"Assessment of Hydrochemical Quality of Groundwater around Ballarpur Industries limited (BILT) Chandrapur District, Maharashtra".

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In

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Ph.D. SYNOPSIS

Assessment of Hydrochemical Quality of Groundwater around Ballarpur Industries Limited (BILT) Chandrapur District, Maharashtra.

ABSTRACT

The groundwater is one of the most important criteria to ascertain its suitability for human beings and irrigation. As Ballarpur is an industrial area the present study focus on the effects of industrial waste water effluent on groundwater as well as on surface water occurring in Ballarpur area within the Chandrapur District of Maharashtra. The obtained results will be compared with World Health Organization (WHO) and Bureau of Indian Standards (BIS) limits.

Keywords: Groundwater, Physico-chemical Parameters, Seasonal variation, Hydrogeochemistry.

INTRODUCTION

As far as we know, earth is the only place in the entire universe where liquid water is found in considerable quantities. In general, it is believed that most of the earth's water has been formed from oxygen and hydrogen released from rocks through volcanic activity. Earth is unique in having an atmosphere that traps the water vapour and a temperature range that keeps most of it in the Liquid form. Water is therefore a characteristic feature of earth.

The sustainability of groundwater for drinking purpose is judged on the basis of pH, TDS, Total Hardness, Cl^{-}, Ca^{+2}, Mg^{+2}, Total alkalinity, Sulphate (SO_4^{-2}), Sodium, Potassium, etc. and sustainability of groundwater for irrigation purpose is judged on the basis of Sodium contents and Electrical Conductivity.

STUDY AREA

Chandrapur district is one of the eleven district of Vidarbha region of Maharashtra. It is bounded on south by Telangana state and east by Gadchiroli district on north by Bhandara, Gondia, Nagpur and Wardha district on by west by Yavatmal district. Wardha river forms the western boundary whereas Wainganga river form the eastern boundary of the district. The district lies between 19^0 30' and 20^0 45' North latitudes and 78^0 46' and 80^0 00' East longitudes.

It falls in part of the survey of India toposheet number 55H, 55L, 56E, and 56I coming an area of 10920 sq. Km.

For the study a Ballarpur industrial area was selected which is situated on the bank of Wardha River in Ballarpur. Ballarpur is a city and municipal council in Chandrapur district in the state of Maharashtra, India. The study area is situated 20 km away from Chandrapur district.

GEOLOGY OF STUDY AREA

The area consists of Archean metamorphic rocks, Vindhyan limestones, Gondwana formation and Deccan traps. In Archean formation consisting granites and granitic gneiss occur in most of the eastern part of the district of extending north –south from Nagbhid to Gondpipri. The rocks are generally devoid of primary porosity, but weathering, jointing, fracturing , sheering etc. create secondary porosity within which the groundwater generally occur in phreatic conditions.

In Vindhyans, limestone are water bearing formation while sandstone due to their hard and compact nature has poor groundwater potential, Vindhyan sediments mainly occur in North central part of the district around Tadoba and Nagbhid in parts of Chimur, Sindewahi, Bhadravati and Nagbhid talukas and in south eastern part of the district in part of Chandrapur and Rajura talukas.

Deccan trap basalt is observed in small area in the North-eastern and South-eastern peripheral part of the district and does not form a promising aquifer in the district. Weathered, jointed, fracture, massive, and vesicular basalt forms an aquifer in the area.

In Gondwana formation comprising of Kamthi and Barakar sandstone and Malleri and Talchir shale occupy North-south extending elongated stretch in central and southern parts of the district in part of Warora, Bhadravati, Chandrapur, Ballarpur, Rajura and Gondpipri talukas.

REVIEW OF LITERATURE

The quality of groundwater is vary with Geology of the particular area, depth of water table, seasonal changes, composition of dissolved salts depending upon sources of salt and surface environment. Groundwater is the principal source of drinking water in both rural and urban parts of India. The consequences of industrialization and urbanization leads to spoiling the water. This is observed that groundwater get polluted due to increased human population, agricultural runoff, domestic sewage, industrial effluents, addition of various kinds of pollutants and human activities .It is therefore necessary that the quality of water should be checked at regular time interval as well as to find out various sources which increased groundwater pollution (Das N.C. 2013).

OBJECTIVES OF RESEARCH:

The main aim of the proposed research work is to find out the impact of Ballarpur industries on groundwater quality with respect to irrigation water, drinking water quality and groundwater pollution status. This will be achieved through the following objectives,

1. To find out the Physico-chemical characteristics of Groundwater.
2. To find out groundwater quality with reference to irrigation requirements.
3. To find out groundwater quality with reference to drinking purpose
4. To find out the pollution status of groundwater
5. To find out lateral and vertical extent of pollution, if any.
6. To demarcate potable and Non-potable zones.

METHODOLOGY TO BE ADOPTED:

Preliminary survey followed by detailed survey will be carried out. The plan includes the well inventory during pre and post monsoon seasons. Selection of sampling sites decided on the basis of overall objectives of the present study. Collection of groundwater and effluent samples is to be carried out and the Physico-chemical parameters will be analyzed.

The sampling and field work will be carried out during pre and post monsoon seasons for three years. The pre monsoons samples will be collected in the month of May and post monsoon in the month of December. The physico-chemical parameters will be determined by the standard methods and the result of the analysis will be check by standard methods for the accuracy.

Field Survey and samples Analyze

Detailed field survey will be conducted in Ballarpur and surrounding areas.

Analyses of samples

IMPORTANCE OF STUDY

International Status

The requirement of water for all living beings is utmost important. The ultimate source of water is rainfall, there are two phase of water, namely surface water and groundwater. The groundwater occurrence and accessibility has been inconsistent all over the World. This may be ascribed to precipitation percentage, physiography and diverse hydrogeological conditions. Both the unmanaged utilization as well as excessive groundwater exploitation are exclusively responsible for lowering of groundwater levels. The groundwater from shallow aquifer occurs in

Dugwells and shallow tubewells, whereas from deep aquifers it is obtained by means of deep Borewells.

National Status

The scarcity of clean and potable drinking water has emerged as most serious issue of the twenty first century. Groundwater is the principal source of drinking water in both rural and urban parts of India. Now a day it is a source used for industrial and agricultural sector. It is observed that groundwater gets polluted due to increased human population, agricultural runoff, domestic sewage, industrial effluent, addition of various kinds of pollutants and human activities. Due to use of contaminated drinking water number of cases of water born diseases has been seen which a cause of health hazards.

Significance of the study

For the study a Ballarpur industrial area was selected which is situated on the bank of Wardha River in Ballarpur. Ballarpur is a municipal council in Chandrapur District in the state of Maharashtra, India. The town was named Ballarshah after the Gond king Ballalshah.

The largest paper manufacturing unit Ballarpur Industries Limited (BILT), largest manufacturer and exporter of paper in India is located in Ballarpur. Ballarpur also has nine coal mines most of the owned by Public Sector Company, Western Coalfields Limited (WCL), additional of Coal India Limited.

The present Study deals with the assessment of impact of Industrial pollution with reference to physico-chemical parameters and their effects on groundwater quality. It is necessary to find out various sources of contamination of surface water as well as groundwater.

PROPOSED WORK PLAN

First Year Plan

Field work and groundwater sample collection will be conducted around Ballarpur Industries Limited. A review of published literature on Indian and Global Groundwater will be carried out. Published and unpublished material from Geological Survey of India (GSI) and other institutions specific to study area will also be collected.

Second Year Plan

Groundwater studies, field work and collected groundwater samples will be analyze and tabulated with the help of various statistical methods and later on it will be presented with the help of cartographic and GIS techniques with the help of software.

Third Year Plan

1. **Interpretation of Data:** Field and collected Groundwater samples will be interpreted
2. **Writing and Submission of Thesis**: The thesis will be written after the interpretation of data and achievement of objectives.
3. **Presentation in Seminars** National level and International levels.
4. **Publication of Research papers** National and International levels.

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